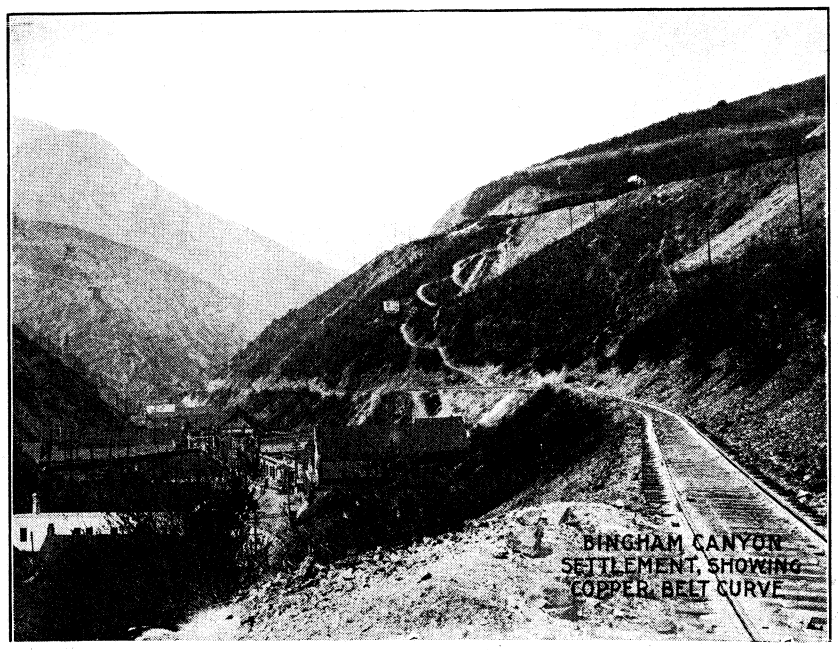
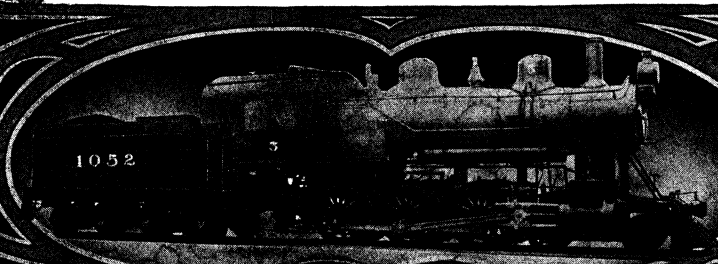
JULY, 1909

THE LOCOMOTIVE WORLD

LOGGING · MINING · PLANTATION · INDUSTRIAL & STANDARD RAILROAD · LOCOMOTIVE POWER



BINGHAM CANYON SETTLEMENT, SHOWING COPPER BELT CURVE



135000 feet per day

was skidded with this

Clyde Skidder

Pretty good day's work isn't it, especially with this kind of ground to work on.

Have you ever done as well?

Because the Clyde Skidder is self-propelling, it requires no switch engine and moves from place to place and is ready for skidding in less time than any other devise now in use.

It's general construction and steam power are more than ample even for maximum logs and it is almost indestructible.

Can't we send you some fac-simile letters from people who are using this machine?

Ask for our beautiful catalogue also.

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SOLE MANUFACTURERS OF
McGIFFERT AND DECKER PATENT SELF-PROPELLING STEAM LOGGING MACHINERY

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ALEXANDRIA, LOUISIANA. 11/21/08.

Clyde Iron Works,
Duluth, Minn.

Gentlemen:-

Answering your esteemed favor of the 6th inst., we are pleased to advise that our skidder is doing excellent work. We are putting in from 2 million to 2-1/2 million feet each month, operating machine from 16 to 20 days. We are well pleased with the results obtained from the use of the skidder.

Yours very truly,

ALEXANDRIA LUMBER CO., Ltd.

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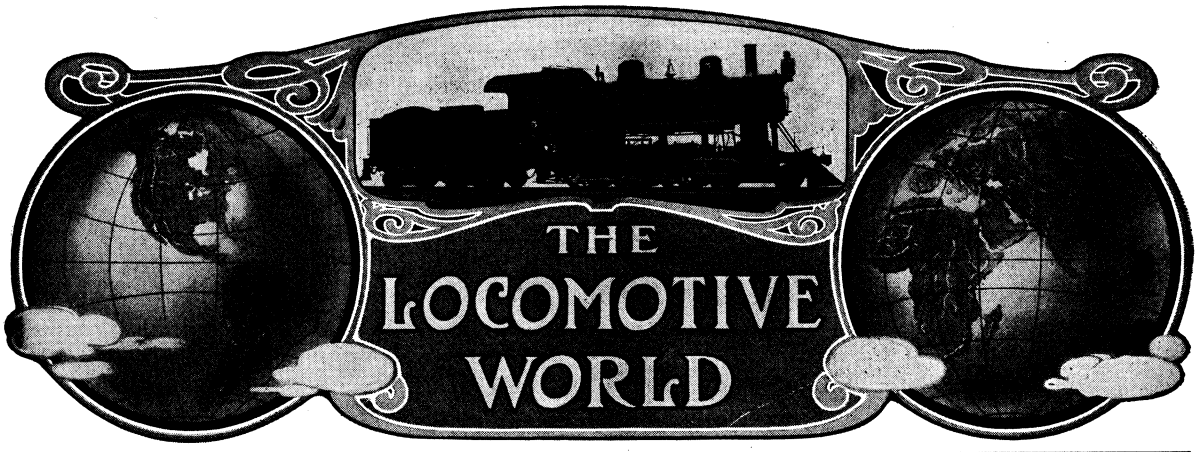

VOLUME 2 JULY, 1909 NUMBER 3

THE LOCOMOTIVE WORLD

PUBLISHED MONTHLY BY

THE FRANKLIN TYPE AND PRINTING COMPANY

H. C. HAMMACK, EDITOR.

210 N. ELIZABETH ST., LIMA, OHIO.

Devoted to the interests of private users of Locomotives and Equipment for Logging, Mining, Plantations and Industrial Railroads.

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Advertising rates furnished upon application. Changes in advertisements intended for a particular issue should reach the office of The Locomotive World not later than the 20th of the month prior to the date of issue. New advertisements requiring no proof can be received up to the 1st of the month of date of issue.

HORSE POWER OF A LOCOMOTIVE.

A great many private users of locomotives, when talking of the power of a locomotive, will refer to same as horsepower. Where they obtain this idea, we cannot understand, as no American locomotive builders rate locomotives in this manner. In fact, the actual horse-power developed can only be determined definitely by the use of an indicator. We can, however, calculate approximately the indicated horsepower developed by the following well known formulae:

$$\frac{\text{PLAN}}{33000}=\text{HP} \quad \text{and} \quad \frac{\text{Tractive Power} \times \text{Speed.}}{375.}=\text{HP}$$

For the benefit of those who may be interested we give an example: P, L, A, N, represent the following terms or figures and are to be multiplied together and divided by 33000:

P=Mean effective pressure in cylinders.
L=Length of stroke in feet.
A=Area of piston in square inches.
N=Number of strokes per minute.

In order to find the value of P without indicator, we must first determine the number of revolutions the drivers will make per minute at the speed given. Suppose it is desired to know the H. P. of a locomotive running twenty miles per hour, size of locomotive, cylinders 15 inches, diameter 20 inches stroke, boiler pressure 180 pounds, drivers 44 inches diameter. The number of revolutions the drivers will make is found by finding the circumference in feet or inches and dividing it into the number of feet or inches in one mile, as follows:

$44'' \times 3.1416 = 138.2340'' = \text{Circumference.}$

For the sake of simplifying the calculation, we will eliminate the fractions and call it 138 inches. Then $5280 \times 12 = 63360$ inches and $63360 \div 138 = 460$ revolutions per mile.

Then, if the locomotive is running at the rate of one mile per minute, the drivers would revolve at the rate of 460 revolutions per minute but as

it is running at 20 miles per hour or sixty minutes, the drivers will revolve $\frac{20}{60}$ of 460 in one minute:

$20 \times 460 = 9200 \div 60 = 153$ revolutions at twenty miles per hour.

By data obtained in a large number of tests it has been possible to approximate closely the mean effective pressure in the cylinders at various speeds in percentage of boiler pressure, and by this method find that at 153 revolutions per minute the mean effective pressure would be equivalent to 52% of the boiler pressure. We then have:

$180 \times .52 = 93.6$ pounds M. E. P. Therefore, 93.6 equals the value of P.

We do not wish to convey that 52% of the boiler pressure will give the Mean Effective Pressure at all speeds as it will not, but would state that according to the data obtained in various tests above mentioned, it has been determined approximately that at fifty revolutions of the drivers per minute, the mean effective would be equivalent to 90 % of the boiler pressure; 75 revolutions per minute 82.5%; 100 revolutions per minute 72.5%; 125 revolutions per minute 62.5%; 150 revolutions per minute 55%; 175 revolutions per minute 45%; 200 revolutions per minute 37.5%; 225 revolutions per minute 32.5%.

Consequently, should it be desired to make calculations at various speeds, the Mean Effective Pressure can be approximated by these figures.

To find the value of L in feet, divide the length of the stroke in inches by 12; thus $20'' \div 12 = 1.66$ or $1\frac{2}{3}$ feet.

To find the value of A, square the diameter and multiply by .7854; thus $15 \times 15 \times .7854 = 176+$ square inches and equals A.

To find the value of N, find the number of revolutions per minute and multiply by 2, as the piston makes two strokes in each revolution of the drivers. In the above calculations we have found that the drivers made 153 revolutions per minute; therefore $153 \times 2 = 306 =$ number of strokes per minute and equals N.

We have found the value of the letters, and substituting known quantities for the letters, we have the following:

$$\frac{93.6 \times 1\frac{2}{3} \times 176 \times 306}{33000.} = 254.5 \text{ or } 255.$$

which is the indicated horsepower developed in one cylinder, and $255 \times 2 = 510 =$ horsepower of both cylinders at twenty miles per hour.

In the second formula stated, viz:

$$\frac{\text{Tractive power} \times \text{Speed}}{375..} = \text{H. P.},$$

we must find the tractive power. This is found by the well known formula described in our June issue, as follows,

$$T = \frac{d^2 \times s \times p}{D}$$

Where
- T=Tractive power.
- d^2=Diameter of Cylinders in inches
- S=Length of stroke in inches
- D=Diameter of drivers in inches
- p=85% of the working pressure of the boiler.

The only change it will be necessary to make in this formula is in the last letter "p" which in the above calculations we have found to be 52%. This difference is accounted for by reason of the fact that in calculating the tractive power of a locomotive 85 per cent. of the boiler pressure is commonly used. This gives the maximum tractive power at slow speed, whereas, in these calculations it is desired to find horsepower at twenty miles and we all know it is not practical to operate a locomotive at full stroke of the piston at 20 miles per hour.

Now, substituting values in our tractive power formula, we have the following:

$$\frac{15 \times 15 \times 20 \times 93.6.}{44} = 9572.$$

which is the tractive power at twenty miles per hour.

Taking up the horsepower formula and substituting known quantities found, we have:

$$\frac{9572 \times 20}{375.} = 510.$$

horsepower of the locomotive at twenty miles per hour.

In these calculations it will be noticed that speed is a vital factor in determining the horsepower of a locomotive as well as the capacity of the boiler, and while these same elements effect the calculations of tractive power to a certain extent, the most intelligent method of rating locomotives is by tractive power and tons hauled after deducting resistance due to internal and rolling friction, grades, curvature, etc.

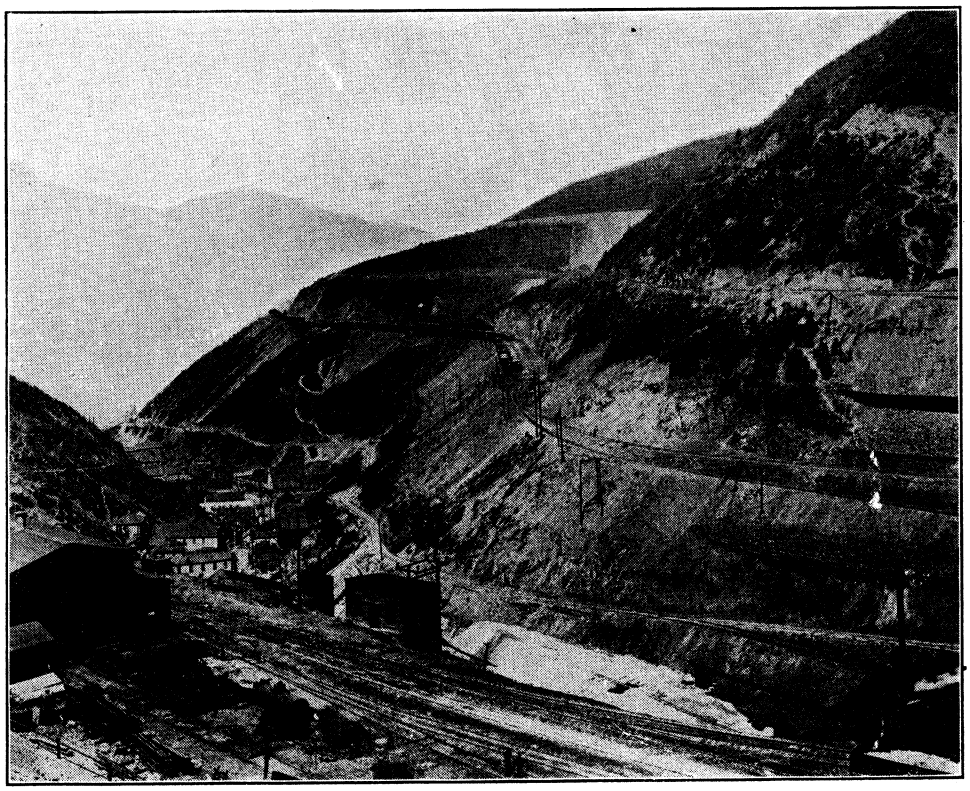
MINERAL RESOURCES OF THE STATE OF UTAH

BY JOHN HICKEY*

The state of Utah takes fourth place in the production of copper and it stands high in the ranks of producers of lead, silver and gold. Its coal mines are enormous and apparently exhaustless and within the border of the state there are millions of tons of the finest asphaltum and other valuable hydro-carbons.

Its capitol, the city of Salt Lake, is located in the midst of and is immediately tributary to the largest and admittedly, the richest mineral territory in the United States. Other districts in the country have perhaps as much stored mineral spread over larger territory, but for concentrated values, the mineral territory adjacent to Salt Lake City has few, if any, equals.

Within a range of ninety miles from the City are hundreds of square miles of rich mineral



BINGHAM CANYON SHOWING A VIEW OF THE LONG 7% GRADE ON THE COPPER BELT R. R.

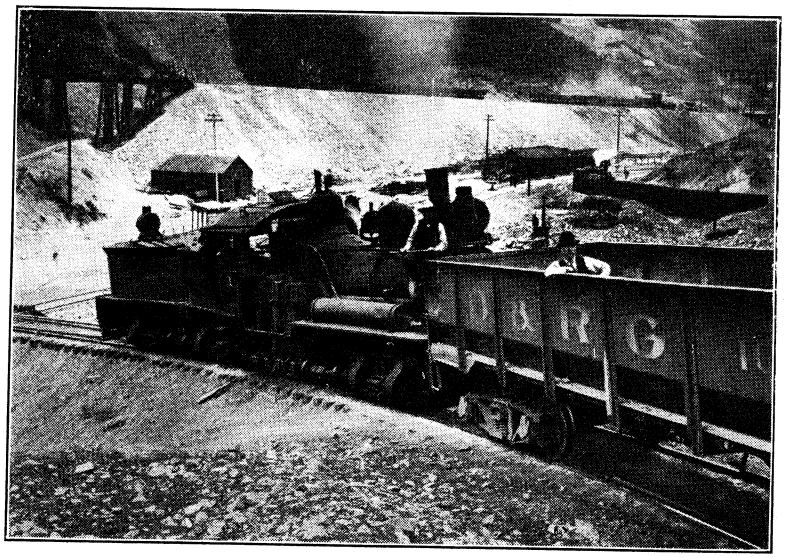
bearing grounds, fully three quarters of which is yet undeveloped. Within thirty-five miles of the city are located a dozen or more large mines of extraordinary producing capacity and wealth. The districts of Park City, Alta, Eureka, Mercur and Bingham share in the production. The Ontario Mine of Park City, a silver and lead producer has paid its share holders nearly $15,000,000 in profits, the Silver King has paid up to date about $11,000,000, the Daly West about $6,000,000 and the Daly-Judge about $5,000,000 with several smaller mines correspondingly profitable.

The Eureka district is equally productive, many of its mines have enriched the owners, so large indeed is its production that a smelter has recently been erected in the valley not far from the principal producing mines and is now in operation and turning out large shipments of bullion per month,

*Formerly Master Mechanic Rio Grande Western Ry,

principally silver and lead. The smelter with its railroad as a feeder is of immense value to the district, as its consummation has encouraged development and is a boon to small producers especially. One of the largest mine owners in the Eureka Mining District is the Jesse Knight Investment Co. This corporation is the originator and the owner of the smelter referred to and they are the builders and owners of the Eureka Hill R. R. This road is about eight miles long and stretches from the Smelter to the midst of the Knight Mines. The road climbs the mountain on grades of 6% 42° curves, and to supply the smelter is operated both night and day. The road is equipped with pressed steel cars and improved Shay locomotives, and, to use a recent expression of one of the officers, is operated with remarkable success in view of the large tonnage moved on single track.

The large mines of Bingham within 26 miles of Salt Lake are of singular importance. Bingham is almost exclusively a copper camp. The magnitude of its mine workings and the enormous amount of crude ore produced is a wonder to all who have inspected the properties. The most modern and intelligent methods of mining prevail, steam shovels, tunnelling machines and every known improvement controls, and although the average value of crude ore produced contains but 1.6% copper the largest companies are making and placing in the market pure copper for less than 9 cts. per pound. The amount of ore moved out of the Bingham district in a day surprises all those who have investigated the matter. One of the largest companies alone handles about ten thousand tons per day from the mines to the concentrators and smelters.

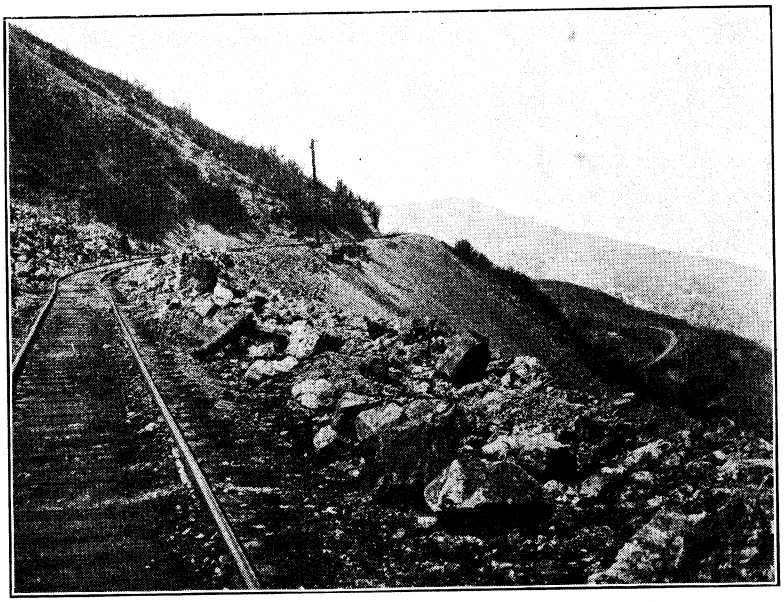


ONE OF THE COPPER BELT LOCOMOTIVES OPERATING ON 5½ % GRADE.

The town site of Bingham is situated in the canyon in the midst of the Oquirrh range of mountains. The latter forming the west wall of the Salt Lake Basin. The mountain tops surrounding the settlement where many of the mines are located rise to heights of many hundred feet and in some cases the mines are 2000 ft. above the homes of the miners. To get the ore down the mountain side to the tracks of the D. & R. G. Ry. was one of the deepest problems facing the beginners. No less important, however, was the presented difficulty of supplying the mines with timber and other material necessary for tunnelling and deep mining. Aerial tramways were suggested and erected to handle the ore down the hill sides, but as before stated this method could not be used to move the mine supplies. The construction of a railroad to the highest located properties seemed inevitable to the success of the camp. The task seemed insurmountable. To construct a track on almost vertical mountain sides meeting rock surfaces, crossing canyons and ravines, hundreds of feet deep, at first sight appeared impossible. The D. & R. G. Co., at its upper terminal, in Bingham Canyon could only operate safely on grades of about 4½%. The new road meant a minimum grade of not less than 5½% and a maximum grade of 8%. Eight miles of the road was built at an enormous cost. It was placed in commission and with it the success of the district, as well as the mining interests, became an assured fact.

The road was well named the Copper Belt R. R. because it circles the mineral hills, penetrating every important point. The track being standard guage, standard cars are used, but the grades and curves, being so extremely severe, the trains are handled exclusively with Shay locomotives.

The Alta Mining District which is situated about seventeen miles southwest of the city of Salt Lake at the base of the West slope of the Wasatch Range of Mountains can be classed with districts of rich mineral deposits. There is in and about Alta at least a hundred square miles of known mineral bearing territory, a twentieth part of which is not worked. The mines that are operated produce wealth from depths of from 700 to 1200 feet. The prevailing metals are lead, distinct silver, copper and a porphyry formation containing a low percentage of gold. It is known that the richest deposits exist some distance up and in from the base of the mountain and there sinking has mostly taken place. Tunnels have also been started at the base of the mountain running in on a horizontal plane for the double purpose of intercepting any scattering veins and of connecting with the veritcal shafts for readily moving the product by mine cars to points convenient for shipment. The largest mine in the district, The Columbus Consolidated, has already in use about three miles of such tunnels and is producing and sending down to the valley smelters thousands of tons of ore per month, the major portion of the ore contains 35% lead, 7 to 14 % copper, and by-products of silver and gold.



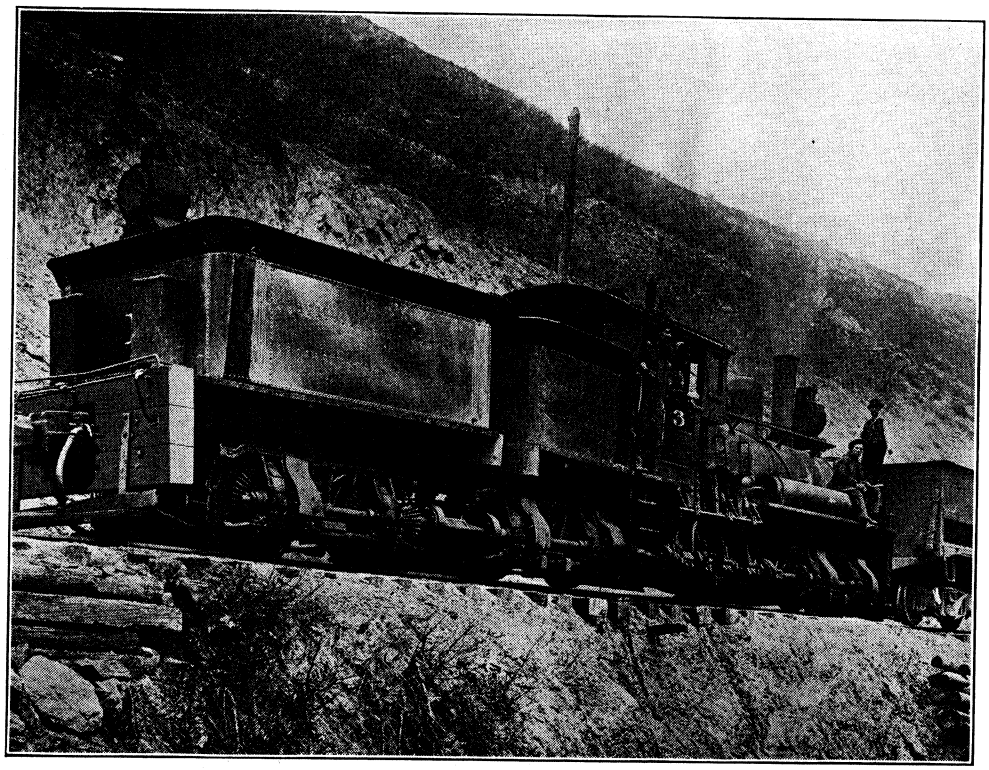
COPPER BELT R. R. NEAR UPPER END OF LINE ON BOSTON CONSOLIDATED HILL, 8% GRADE

The ore containing 7 to 14% copper is important in view of the fact that the greater copper mines of Bingham, 35 miles away, are making copper in immense quantities and at considerable profit from porphyry rock containing but $1\frac{3}{4}$% copper.

VIEW ON 8 % GRADE COPPER BELT R. R. 65 TON SHAY LOCOMOTIVE.

A dozen mines are now in operation in the Alta district and the writer was told by a mining expert of the camp that several would be making good returns in a year hence. The Columbus Consolidated, while meeting with many difficulties during the past five years, levying assessments on its share holders, etc., is now producing handsomely. Some three years ago its stock could be purchased for less than 10 cts. a share, was sold on the Salt Lake Mining Exchange recently for $2.80 per share, under the prospect, of course, of approaching dividends. The Alta fields at present are difficult of access. One or two of the properties have recently built aerial tramways to get the ore down to a point where teams can reach it for transportation to the smelters. The mine supplies, however, have to be moved by animal power up difficult roads and steep inclines and of course this crude method of hauling detracts much from the profits.

A railroad has been talked of but the magnitude of the undertaking, together with its accompanying high cost will delay its construction until there is considerably more development work and a largely increased output. The wealth of the district, however, justifies better transportation facilities and many think a railroad will be built, and built soon.



COPPER BELT R. R. 7 4–10 % GRADE, 85 TON LIMA LOCOMOTIVE.

Utah presents wonderful variety in its mining zones; while silver, lead, copper and zinc are the prevailing metals, the State also contains treasures of gold. Mercur is the actual gold camp of Utah, while silver, in its almost pure state, I am told, was found there originally, during the past dozen years or more it is strictly a gold producing district. In early days silver was found near the surface, or, as the miners say, "at the grass roots," but at greater depth gold is found in combined deposits of clay and sand, in porphyries and in what is known as altered limestone.

Mercur is situated in the Camp Floyd district, fifty miles southwest of Salt Lake City, in the same range of the Oquirrh Mountains, as Bingham, but twenty miles almost directly south of the latter. The district first received the name of Camp Floyd, it being adjacent to the camp site of General Albert Sydney Johnson, when that officer remained with the army of Utah in 1858–9 and 60. The location was pointed out to the writer a few days ago and is certainly one of the most beautiful camping sites it was our good fortune to ever see. Many theories have been advanced relative to the existence and origin of gold in Mercur, the subject has been frequently and warmly discussed.

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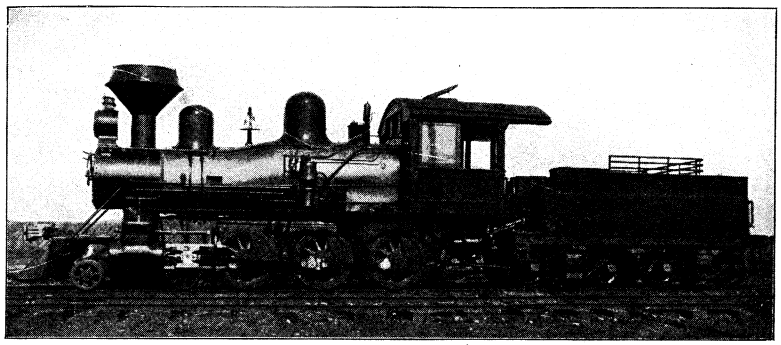
Have this Brand New 12" x 18" 4-6-0-8 Locomotive on hand for immediate shipment. Illustrated below. Write for description.



We also have the following second-hand Locomotives for sale CHEAP

1	15 ton Shay.	42 " Gauge.	Mississippi delivery	No. 0810
1	15 ton Shay.	56½" Gauge.	South Carolina delivery	No. 0818
1	17 ton Shay.	56½" Gauge.	South Carolina delivery	No. 0819
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1	33 ton Shay	56½" Gauge.	Michigan delivery	No. 0827
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1	35 ton Mogul.	56½" Gauge.	Mississippi delivery	No. 089
1	38 ton Mogul.	56½" Gauge.	Arkansas delivery	No. 0817
1	36 ton Mogul.	56½" Gauge.	Georgia delivery.	No. 085
1	55 ton Mogul.	56½" Gauge.	Texas Delivery.	No. 0821

Write for full information and price on the above Equipment.

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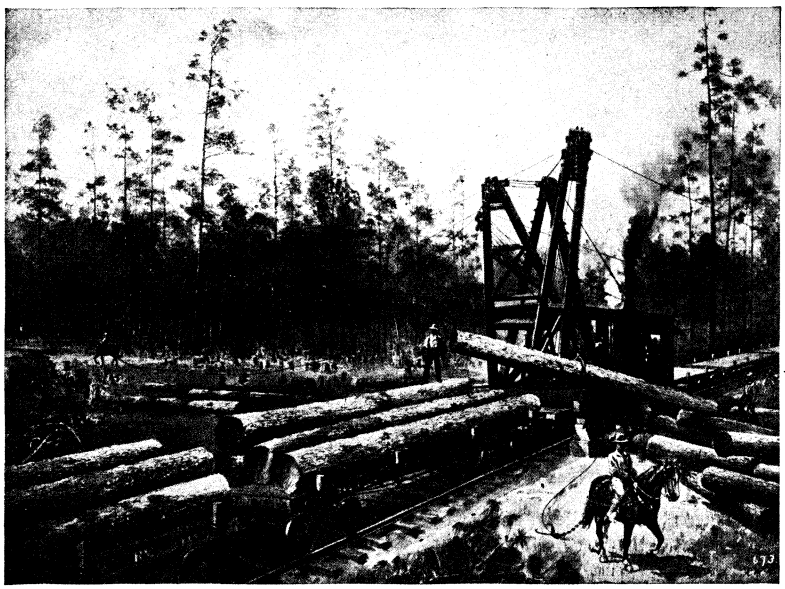
when A DAY'S WORK with a LIDGERWOOD was

215,311 FEET

Skidded and Loaded by One Machine and Eighteen Men. This same type of machine averaged over 3½ million feet per month for six consecutive months



MESSRS. WOODWARD, WIGHT & COMPANY, LTD., New Orleans, La.

GENTLEMEN:—Referring to your letter of recent date, per your Mr. Huey, asking that I send you copy of affidavit shown to your Mr. Huey in my office, showing work performed at one of our camps by the use of one of the Lidgerwood Skidders, beg to enclose you herewith copy of the affidavit in question. Yours truly, C. P. MYER, Manager Mills and Logging.

STATE OF TEXAS, COUNTY OF JASPER: BUNA, TEXAS, July 13th, 1907.

Before me, W. T. Rigsby, Notary Public in and for said State and County, on this day appeared F. G. Weathersby and William Lowe, who on oath state that they did on the Eleventh day of July, 1907, skid and load with the steam skidder at Camp No. 3 belonging to the Kirby Lumber Company Two Hundred and Fifteen Thousand Three Hundred and Eleven feet of pine timber within ten hours. (Signed) F. G. WEATHERSBY, Supt.
WM. LOWE, Skidder Foreman.
W. R. MERCER, Scaler.

Sworn to and subscribed to before me this 13th day of July, A. D. 1907.
W. T. RIGSBY, Notary Public, Jasper County, Texas

If you want to know what this machine and others have done every day since their installation, write to us.

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